

# **DCF1000**

**DCF Radio Time Code Receiver**

---

**User Manual**

Version 1.2

## COPYRIGHT

© 2011 - 2015 World Time Solutions Limited. All Rights Reserved.

All information contained within this document is the property of World Time Solutions Limited and cannot be used or reproduced by any person or company without written consent from World Time Solutions Limited.

World Time Solutions Limited reserves the right to make periodic amendments to the information in this document without notice.

## TRADEMARKS

All registered trademarks and trademarks are property of their respective owners.

## RoHS COMPLIANCE

World Time Solutions Limited works with its suppliers to ensure all products comply with the Restriction of Hazardous Substances (RoHS) directive.

For further information, please visit our web site at:

[www.worldtimesolutions.com/rohs.html](http://www.worldtimesolutions.com/rohs.html)

## DISPOSAL



Please dispose of this unit properly. To minimize pollution and help protect the environment, this unit should be recycled.

For further information and/or to view a copy of the *World Time Solutions Limited Waste Electrical and Electronic Equipment Policy*, please visit our web site at:

[www.worldtimesolutions.com/recycle.html](http://www.worldtimesolutions.com/recycle.html)

## SOFTWARE LICENCE

This product contains proprietary World Time Solutions Limited software. This software is supplied under the *World Time Solutions Limited Software Licence Agreement*.

For further information or to view a copy of the software licence, please visit:

[www.worldtimesolutions.com](http://www.worldtimesolutions.com)

## LIMITED WARRANTY

The DCF1000 DCF Radio Time Code Receiver is guaranteed against failure due to faulty parts or workmanship for a period of five (5) years from date of purchase.

In the event of product failure due to faulty parts or workmanship within the warranty period, World Time Solutions Limited, at its own discretion, will either (a) repair the product, (b) supply a replacement product, (c) supply a functionally equivalent replacement product, or (d) refund the purchase price of the product.

The limited warranty will not apply if (a) the product has not been installed or operated as per our instructions, (b) the product has been modified in anyway.

In the event of failure, the DCF1000 should be returned to the manufacturer for inspection and repair. Please visit our support pages for further details:

[www.worldtimesolutions.com/support.html](http://www.worldtimesolutions.com/support.html)

## TECHNICAL SUPPORT

To obtain help with the installation or operation of the DCF1000, please visit our web site at:

[www.worldtimesolutions.com/support.html](http://www.worldtimesolutions.com/support.html)

# 1 - Introduction

The DCF1000 is an economical radio time code receiver system designed to synchronise to the DCF radio transmission broadcast from Mainflingen near Frankfurt, Germany. Once synchronised, the receiver provides time and date information to an MC Series master clock via a cable connection.

The wide sensitivity range of the DCF1000 allows reliable signal decoding towards the limits of the broadcast range. Please refer to section 2 for installation recommendations and section 3 for details of confirming system operation.

## 1.1 - Package contents

The DCF1000 is supplied with the following component parts:

- DCF1000 77.5 kHz DCF Radio Time Code Receiver
- Cable for connection to a World Time Solutions MC Series master clock (*Please note: The length of cable supplied is dependent on the model ordered. See appendix A for details*)
- 5 way socket block connector for connection to an MC Series master clock
- A4 user manual

## 1.2 - DCF1000 front view

The drawing below shows the front view of the DCF1000.

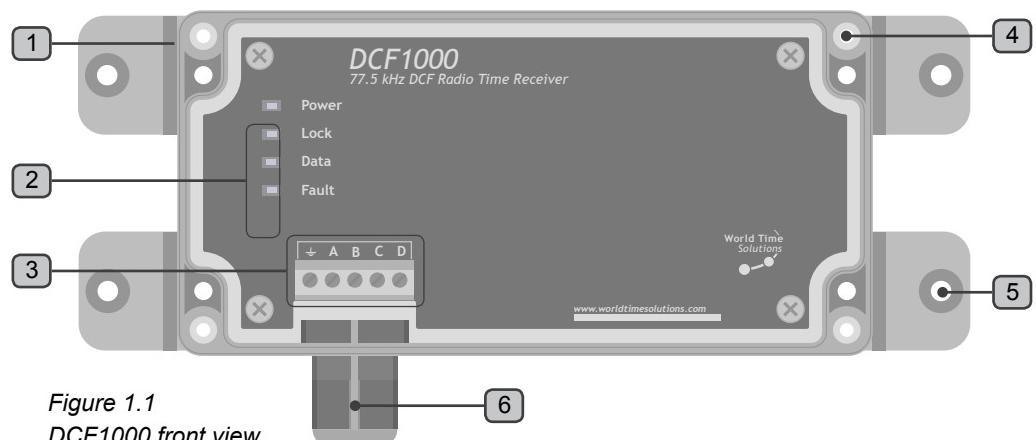


Figure 1.1  
DCF1000 front view

No.	Function	No.	Function
1	IP66 (NMEA 4X) polycarbonate enclosure with clear cover	4	Cover fixings (x4)
2	Status LEDs	5	Case fixing points (x4)
3	Cable connection point	6	Cable entry grommet

Table 1.1 - DCF1000 functions

# 2 - Installing the DCF1000

---

The DCF1000 should be installed in a suitable location following the recommendations in section 2.1 below. The system should be fixed in place and then connected to the MC Series master clock using the supplied cable. If required, the cable may be extended by following the recommendations in section 2.3.

## 2.1 - Recommended installation locations

To achieve the most reliable operation the DCF1000 should be installed in the following optimum location:

- On the outside of a building, away from any metallic objects or electrically noisy equipment. The antenna should be positioned on the side of the building closest to the transmitter. In addition, the front (clear) face of the antenna should be facing towards the transmitter. (*The transmitter is located in Mainflingen near Frankfurt, Germany*).

If external installation is not practical, depending on the signal strength and the level of radio interference, it may be acceptable to install the antenna in the following location:

- Mounted internally, away from any metallic objects or electrically noisy equipment. The front (clear) face of the antenna should be facing towards the transmitter. (*The transmitter is located in Mainflingen near Frankfurt, Germany*).

**WARNING: THE DCF1000 SHOULD NOT BE INSTALLED IN A LOCATION SUSCEPTIBLE TO A DIRECT LIGHTNING STRIKE.**

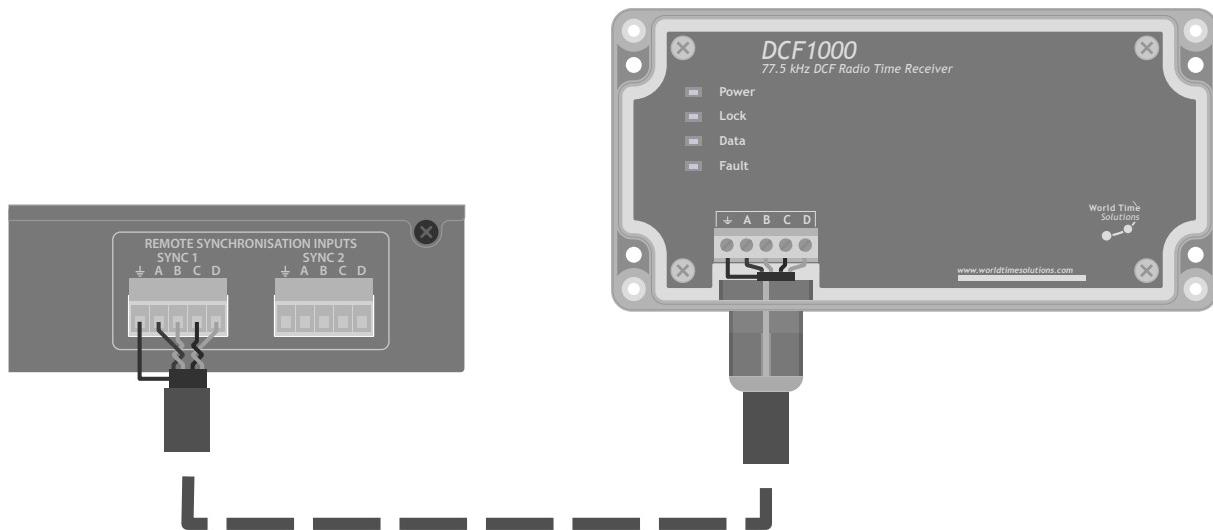
## 2.2 - Physical installation

**IT IS RECOMMENDED THAT THE ANTENNA SHOULD NOT BE PERMANENTLY FIXED IN POSITION BEFORE SIGNAL RECEPTION HAS BEEN CONFIRMED.**

The DCF1000 should be secured in position using the four 4.5mm (0.178") case fixing points (see the drawing in section 1.2). Care should be taken to ensure the fixings used (not supplied) are suitable for the application.

## 2.3 - Connecting the DCF1000 to the master clock

The DCF1000 is supplied with a length of four core cable for connection to an MC Series master clock. The cable should connect the DCF1000 cable fixing point to a Remote Synchronisation Input on the master clock. Please refer to the drawing on the following page and table 2.1 for details of cable connections.



*Figure 2.1 - DCF1000 master clock connection*

Terminal ID	Cable colour code
GND	Cable screen drain wire
A	Black / Red
B	Red
C	Black / White
D	White

*Table 2.1 - Cable connection detail*

If required, the cable may be extended using Belden 9502 type cable up to a maximum total length of 150m (500ft). For low smoke/plenum applications, the supplied cable should be substituted for a Belden 82502 (or equivalent) type cable.

# 3 - System operation

---

Following installation (see section 2) and upon powering the MC Series master clock, the DCF1000 will automatically attempt to synchronise to the DCF radio signal. The DCF1000 also begins to send setup information to the master clock.

Depending on signal strength and the level of radio interference, system lock may take up to 30 minutes. Once the DCF1000 has synchronised to the DCF radio transmission, time and date information is automatically sent to the master clock.

## 3.1 - DCF1000 status information

The operational status of the DCF1000 may be visually confirmed via the status LEDs (see figure 1.1). The table below lists the function of the different LEDs.

LED	Status
Power	Green LED illuminates continuously when power is applied to the DCF1000 and the system is running
Lock	Green LED illuminates continuously when the DCF1000 is synchronised to the DCF transmission
Data	Green LED flashes to indicate DCF data being received
Fault	Red LED illuminates if no radio data is detected for a prolonged period

Table 3.1 - Status LEDs

The synchronisation status may also be confirmed via the MC Series master clock. Please refer to the user manual supplied with the master clock for further details.

## 3.2 - Improving signal reception

The radio detection circuit in the DCF1000 radio time code receiver is highly directional in its ability to decode the DCF signals. To enable the best reception of the DCF signal, the installer should ensure that the decoder circuit is properly aligned with the DCF transmitter (located in Mainflingen near Frankfurt, Germany).

Alignment may be confirmed by slowly rotating the DCF1000 and observing the operation of the 'Data' LED. When correctly aligned, the 'Data' LED should flash once per second.

# A - Specifications

<b>Typical Performance Specifications:</b>	
PPS accuracy:	40 msec
<b>I/O Connections:</b>	
I/O connection:	Single 1000 Series communication port for connection to a MC Series master clock
<b>Mechanical &amp; Electrical Specifications:</b>	
Dimensions:	202 x 80 x 55 mm (7.95" x 3.15" x 2.17") (including removable wall brackets, excluding cable grommet)
Weight:	0.5 kg (excluding cable)
Enclosure:	IP66 / NEMA 4X rated, UV stabilised polycarbonate enclosure. Light grey body and clear cover.
Cable:	Two pair plus drain 7x32 (24 AWG) stranded cable with 100% foil shield and semi-rigid, sunlight resistant, Polyvinyl Chloride (PVC) jacket.
Cable length supplied:	DCF1000-05: 5m (15ft) DCF1000-15: 15m (50ft) DCF1000-50: 50m (150ft)
<b>Environmental Specifications:</b>	
Operating temperature:	-20 to +50 °C
Relative humidity:	0% - 95%, noncondensing
<b>Standards Compliance:</b>	
Electrical Safety:	BS EN 60950-1:2006
Radio Disturbance:	BS EN 55022:2006
Immunity Characteristics:	BS EN 55024:2003

**World Time Solutions Limited**

1st Floor, Barclays House, Gatehouse Way, Aylesbury, Buckinghamshire, HP19 8DB, United Kingdom  
+44 (0) 1296 331428 - [sales@worldtimesolutions.com](mailto:sales@worldtimesolutions.com)  
[www.worldtimesolutions.com](http://www.worldtimesolutions.com)